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REMEDIAL ACTION REPORT

**Pownal Tannery Superfund Site
Pownal, Vermont**

September 2005

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I. INTRODUCTION

This Remedial Action Report documents that EPA has completed all remedial response activities at the Pownal Tannery Superfund Site in accordance with OSWER Directive 9320.2-09A-P, January 2000. EPA conducted a final inspection on September 27, 2005 and has determined that the remedy has been constructed in accordance with the remedial design and remedial action (RD/RA) plans and specifications and is operational and functional.

II. SUMMARY OF SITE CONDITIONS

A. Site Location and history:

The Pownal Tannery Superfund Site consists of a 28-acre set of parcels located between Route 346 and the Hoosic River in the Village of North Pownal, Vermont, which is in the south-western corner of the state. The location of the Site is shown on Figure 1. The Site was a former hide tanning and finishing facility owned by the Pownal Tanning company, Inc. The tannery began operation in 1934 and declared bankruptcy in 1988. The Site originally consisted of three contamination sources; the former tannery building complex (169,000 square feet), a capped sludge landfill on Dean Road (3 acres), and a 16 acre sludge lagoon system that consisted of 5 adjacent areas (Figure 2). The EPA, during a Non-Time Critical Removal Action (NTCRA) completed in 2001, permanently capped the landfill (Figure 3) and removed the building complex (Figure 4). The landfill had been partially capped by the Pownal Tanning Company in 1982, but was not completed upon the company's bankruptcy in 1988. Through a 1998 Record of Decision (ROD), contamination at the remaining sludge lagoons was addressed by construction of a second cap (Figure 5). Under a Memorandum of Agreement (MOU) and a Superfund State Contract (SSC) between EPA and the Vermont Department of Environmental Conservation (VTDEC), the State of Vermont is performing all Operation and Maintenance activities at the Site.

The area surrounding the Site is a rural and residential community with approximately 3,500 residents, with the nearest residences being approximately 200 feet from the lagoons. These residences rely upon groundwater from private wells for their water supply. The Site has not adversely impacted any private water supply.

The lagoon complex was partially covered with soil, over which disturbed wetlands vegetation was present. Three of the five lagoons on the western side border the Hoosic River, which is used for recreational purposes (VT Water Quality Standards, Class B for high quality habitat). On the eastern border of the lagoon site, there is an access road, which is adjacent to railroad tracks owned and operated by the Guilford Transportation Rail Company. To the south of the

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lagoon complex is the former tannery building parcel and a hydroelectric facility and dam that were built in 1955 for use by the tannery. This area was remediated to CERCLA residential standards during the NTCRA, was re-graded and seeded, and is being recreationally utilized by the town of Pownal.

A variety of materials, many of which are hazardous, were used and stored in the former tannery building. In April 1993, 12,830 pounds of materials from throughout the former tannery building were collected, sorted for compatibility, and combined and consolidated for removal during an EPA Removal Program emergency removal action. A brief summary of these substances includes chrome residue, chrome powder, aluminum, solvents, asbestos, dioxin and acids.

From 1940 until 1963, effluent tanning process water was released directly to the Hoosic River. In 1963, two lagoons were constructed by Pownal Tanning Company at the northwest end of the property, adjacent to the north bank of the Hoosic River. The lagoons allowed the settling of solids from the wastewater sludges before their ultimate discharge to the Hoosic River. In 1971, the two lagoons were subdivided and expanded to create five lagoons. In 1978, a concrete clarifier was constructed in the vicinity of Lagoons #3 to provide additional wastewater treatment. Treatment of effluent tanning process water consisted of screening the wastewater, settling of suspended solids, chemical coagulation and settling of additional suspended solids in the clarifier, biological oxidation of dissolved materials, algae stabilization and aerated polishing.

Before 1980, wastewater entered the lagoon system at Lagoon 1 and passed sequentially through each of the lagoons into Lagoon 5, where treated tannery process water was discharged to the Hoosic River. By the 1980s, Lagoons 1, 2, 3, and 4, which had become filled with accumulated sludge, were bypassed so that wastewater from the clarifier discharged directly to Lagoon 5. The lagoons continued to receive treated effluent wastewater until the company ceased production in 1988.

The sludge landfill was established on a 3 acre parcel southwest of the Pownal Tanning Company in 1982. The sludge landfill is located adjacent to wetlands along the southern bank of the Hoosic River, upstream of the Pownal Tanning Company. Originally, the 54,000 square foot sludge landfill was approximately 400 feet long and varied from 80 to 200 feet wide. It consisted of three separate cells, constructed from 1982 to 1990. The three cells received sludge from the clarifier filter press and sludge removed from Lagoons 2 and 4. Cells 1 and 2 were capped with two feet of silty sand in 1983 and 1987. Cell #3 was partially capped circa 1990 with soil.

Hydrogeologic investigations were performed at the property in 1988 by SP, Inc. and by Saunders Associates. Between 1981 and 1987, twenty-one overburden

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ground water monitoring wells were installed in the vicinity of the lagoons and the sludge landfill. A preliminary assessment of the property was performed by an EPA contractor on March 31, 1987. A Site Inspection Prioritization was completed in December 1993. A pre-NPL field investigation was completed in March 1997, which included the collection of surface water, lagoon water, sludge landfill leachate, lagoon sludge, and soil samples from the property. The results of this work indicated that hazardous substances were released to surface water from the on-site lagoons. Substances detected in sources on the property include solvents, preservative chemicals associated with the tanning industry, polychlorinated biphenyls (PCBs), inorganic elements, and dioxins.

The Site was listed on the NPL in January 1999. EPA signed an Action Memorandum for a non-time critical removal action ("NTCRA") in March 1999. The NTCRA included decontamination of the tannery buildings, building demolition and off-site disposal of debris, excavation of contaminated soil and sludge under the former buildings and on-site disposal in the existing landfill, and a RCRA C cap at the landfill. This work was completed in 2001. All maintenance is currently being performed by DEC, pursuant to the MOU and SSC, and includes environmental monitoring which is being performed to ensure ongoing protection of human health and the environment. This effort has been included in the O&M Plan for the final remedy. To assess the migration of low levels of contaminants in the ground water, existing ground water monitoring wells are being periodically sampled. Samples from adjacent private water supplies are collected and analyzed to ensure that site contaminants are not impacting local residents.

The lagoon area was addressed during an RI/FS, which began in the Spring of 1999, concurrent with the NTCRA, and was completed in July 2002. The RI/FS and human health risk assessment concluded that there is an unacceptable risk from exposure to sludge in lagoons 1, 3 and 5 (see Figure 2) and that a remedial measure was required. The Proposed Plan for the lagoon area was submitted for public comment on July 18, 2002. The ROD was completed in September of 2002. The Proposed Plan called for excavation of saturated and unsaturated contaminated soil and sludge in lagoons 1 and 5 and consolidation of these materials over lagoon 3 and in the southeast corner of lagoon 4. To reduce the potential human-health risks associated with direct contact with the contaminated material, the remedy included covering the soil and sludge with a low permeable landfill cap. The consolidated wastes were graded and storm water controls installed to minimize groundwater infiltration into the wastes. This cap was designed to resist future flooding events and to protect future users of this property from direct contact with the sludge material. Maintenance of the landfill cap is being performed by the VTDEC and is required for at least 30 years.

B. Enforcement History

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The Pownal Tanning Company, who solely owned and operated the Site, became insolvent in 1988. They were never issued a CERCLA notice of liability letter and they have never been a recipient of an EPA enforcement measure. No other potentially responsible parties have been identified for this Site, therefore the Site became federal lead. A close out memorandum (e.g., decision not to pursue cost recovery at the site) was signed in 1997. The town of Pownal has obtained title to the former tannery building and the lagoon area through a tax foreclosure.

C. Waste Characterization

The following sections describe the nature and extent of contaminants that were detected in the areas investigated during the Remedial Investigation.

Soils and sludge

Lagoon 1: Lagoon 1 contained the thickest accumulation of sludge. The sludge was generally buried beneath a thin layer of cover material and therefore the surficial soil samples generally contained elevated concentrations of Site contaminants. Lagoon 1 exhibited the highest contaminant concentrations on the entire Site.

The sludge present in lagoon 1 was found to consist of moist organic silt including layers of gray clay and varying quantities of hair and hide fragments. Total VOC concentrations in the sludge were generally observed to range from 50-200 ppm and in one sample the total VOC concentrations exceed 1 per cent. Several SVOCs were also detected in lagoon 1, with the highest concentrations present buried below 1-2 feet of cover material. Elevated metals concentrations were detected including chromium at concentrations typically ranging from 10,000-70,000 ppm and lead from 1,000 to 2,000 ppm. PCBs were detected in the surface soil and in the sludge at concentrations ranging up to 400 ppb, and pesticides are present but at low concentrations. Dioxin Toxicity Equivalence Quotient (TEQs) exceeded 1 ppb in several samples. None of the samples tested for Toxic Characteristic Leachate Procedure (TCLP) exceeded the RCRA Hazardous Waste threshold, which is also the case for the remaining lagoons on-site.

Lagoon 2: Lagoon 2 contained only a very small quantity of sludge. There is no significant contrast in chemical concentrations versus depth. This lagoon was largely excavated and moved to the Dean Road sludge landfill initiated by the Pownal Tannery Company under a state order in the 1980's. In general, fewer site contaminants are present in lagoon 2 and the chemical concentrations in the Lagoon Area are generally lowest in lagoon 2. Inorganic constituents remain present at levels close to background soil conditions (including arsenic, cadmium, chromium, lead, nickel and cyanide). All dioxin TEQs were less than 1 ppb.

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Lagoon 3: Lagoon 3 is the smallest of the lagoons. It was covered with gravel fill and was largely un-vegetated. Metals were present in the greatest concentration within the sludge layer. Cadmium was not detected in surface soils, nor in the underlying gravel layer, but is present in the sludge at concentrations up to 42 ppm. Chromium and lead are present at concentrations up to two orders of magnitude greater (chromium up to 18,000 ppm, lead up to 565 ppm) than in surface soils or the underlying soil. All dioxin TEQs were less than 1 ppb.

Lagoon 4: Lagoon 4 is the largest lagoon. The maximum total VOC concentration is less than 200 ppb. SVOCs are also present at low concentrations. The highest metals concentrations in lagoon 4 are present in the surficial soils. Lead, chromium and cadmium are present at higher concentrations in the surface soils than in the subsurface soils.

Lagoon 5: Lagoon 5 sludge existed primarily underwater throughout the year. Two SVOCs, including pentachlorophenol (6,300 ppb at one location) and bis(2-ethylhexyl)phthalate were detected (less than 800 ppb). Several metals were detected including arsenic (up to 2.1 ppb), chromium (up to 16,100 ppb), lead (up to 624 ppb) and mercury (up to 4.1 ppb).

Ground Water

Fourteen groundwater monitoring wells were installed in the Lagoon area during the RI. Five rounds of sampling were performed. Primarily VOCs (acetone, methylene chloride, MTBE, carbon tetrachloride, toluene, tetrachloroethylene, chlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene), SVOCs (diethylphthalate, atrazine, bis(2-ethylhexyl)phthalate) and metals (chromium, lead, cyanide, arsenic, zinc) were detected at low concentrations. However, the data indicated that there were no consistent exceedances of federal or state Maximum Contaminant Levels (MCLs). TCLP test results from the lagoons indicate that the Site waste materials are not actively generating leachate.

Surface Water, Sediments and Ponded Water

Surface water samples were collected at locations in the Hoosic River up stream of the Site and adjacent to all three down gradient source areas, including the sludge landfill, former tannery building and the lagoons. Down stream samples were also collected. Aluminum and barium are present in unfiltered river surface water samples at concentrations that exceed the National Water Quality Criteria-Chronic levels. Surface water samples were collected from ponded water in lagoons 1, 2, 4 (there are three ponds in Lagoon 4), and 5. Surface water was also collected from the reach of the Hoosic River, adjacent to the Lagoon Area, at four locations. Aluminum, barium and magnesium are present in unfiltered surface water samples from the lagoon ponds at concentrations that exceed the

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National Water Quality Criteria-Chronic levels. None of the filtered samples from the lagoon ponds contained metals or cyanide at concentrations above their respective National Water Quality Criteria-Chronic levels. Six SVOCs are present in Hoosic River sediment samples. Five of these compounds are present at concentrations that exceed their respective Ontario Ministry of the Environment Lowest Effect Level values. No pesticides were observed above their respective detection limits in any of the sediment samples.

PCBs were detected in four Hoosic River sediment samples from the Lagoon Area, ranging in concentrations of 86 to 270 ppb. Dioxins were detected in the two Lagoon pond sediment samples (TEC ranging from 106 to 127 ppt) and in the Lagoon Area Hoosic River sediment samples (TEQ less than 3 ppt).

All exceedances in the Hoosic River surface water and sediments were detected at higher concentrations upstream of the Site, including the tannery sludge landfill, former tannery building area, and the lagoons. Therefore, the exceedances of national standards for both surface water and sediments can be linked to non-site related discharges or background levels.

Residential Wells

Only two VOCs were observed in residential wells above their respective detection limits (Acetone, MBTE). Over several rounds of sampling, there were no consistent detections with respect to these contaminants, and they are not considered to be Site related. Residents with exceedances were offered bottle water. No SVOCs, pesticides or PCBs were detected in any residential well above state and federal drinking water criteria. Only one well contained a metal (lead) at a concentration (493 ppb) that exceeded the MCL (15 ppb). Due to this anomalous result, this well was re-sampled and lead was not found to be present above the MCL.

D. Record of Decision and Action Memorandum

The ROD set forth the selected remedy for the entire Site which involved the excavation and consolidation of tannery lagoon waste, construction of a low permeability cap over the consolidated wastes on-site, long-term monitoring of river sediments and ground water, and institutional controls to prevent ground water consumption and excavation of waste in the lagoon area. The remedy also encompasses the maintenance of a landfill cap at an area of the Site remediated under an Action Memorandum for the previous NTCRA. The selected response measures are a comprehensive approach for this Site that addresses all current and potential future risks caused by Site wastes. At the former tannery lagoons the cleanup approach will prevent direct contact risks with contaminated lagoon waste and will significantly decrease further off-site migration that the lagoon sludge could cause through leaching to the ground water or erosion to the

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adjacent river through flooding events. As a result of previous removal actions, the soil and sludge contamination in the lagoon area was the only medium requiring remedial action. The groundwater was determined not to present a significant human health concern.

The major components of the ROD included:

1. Excavation and consolidation of waste in three of five lagoons on-site, and construction of a solid waste cover system. The excavated areas and the cap were required to be restored consistent with current and future site usage.
2. Land-use restrictions in the form easements and covenants to prevent the disturbance of the capped soil and sludge, and to prevent the ingestion of ground water from beneath the five existing lagoons.
3. Long-term monitoring of ground water, residential wells and river sediments will be performed to evaluate the success of the remedial action. Additional biota sampling (fish, mammals, and plants) may also be performed, as necessary, should the concentrations of site related contaminants increase significantly;
4. Long-term operation and maintenance of the landfill cap constructed as part of the NTCRA (through a previous Memorandum of Agreement between the State of Vermont and EPA); and
5. Five-year reviews will be performed to assess future ongoing protectiveness of the remedy until such time as EPA determines that the CERCLA cleanup goals identified in the ROD have been achieved.

Previous removal actions at the Site addressed principal and low-level threat wastes. EPA has determined that human health and environment are protected and that no further response measures were necessary. The remediation that has been completed as required by the Action Memorandum and ROD and has addressed all the source of contamination found in soil, the ground water and river sediments at the Site. These actions have eliminated the principal threat of direct contact to the waste and will significantly reduce infiltration and precipitation of contamination to the ground water, prevent erosion of contamination into the floodplain, and eliminate surface water runoff to river sediments.

As part of the risk assessment, site-specific clean-up criteria were developed, representing the maximum contaminant concentrations that do not pose unacceptable risks to human health. Materials containing contaminant concentrations in excess of these clean-up criteria were removed and incorporated into a consolidated landfill as identified in the Action Memorandum and ROD. The site-specific risk-based clean-up criteria specified are

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summarized in the table below.

Soil Cleanup Levels Pownal Tannery Superfund Site Pownal, Vermont	
Contaminant	Preliminary Remediation Goal (mg/kg)
Benzo(a)anthracene	1.7
Benzo(a)pyrene	0.17
Pentachlorophenol	7.7
N-Nitroso-di-n-propylamine	0.27
Arsenic	1.1
Chromium	733
Mercury	23
Lead	1,000
Dioxin TEQ	0.001

F. Redevelopment Potential

The Town of Pownal was a recipient of a \$100,000 EPA grant in 1999 to develop one of the first ten national Site Redevelopment Plans. Pownal's primary redevelopment plans include building a wastewater treatment facility on Lagoon 2, which began in the spring of 2005. They have received substantial grants from both EPA and the USDA (Farm Bill) to build this facility. Their community also supports utilizing the Site for mixed recreational use, including a potential soccer field, seasonal ice skating rink, and a picnic area. The Pownal Tannery Superfund Reuse Assessment Report was completed in February 2001. A Reuse Assessment Steering Committee was formed and continues to make progress on implementing their plans.

III. REMEDIAL CONSTRUCTION ACTIVITIES

Several pre-construction activities were performed. A pre-design study was completed in the winter of 2003, which included modeling to evaluate the impacts of the capping activities on the flood plain of the Hoosic River. A more comprehensive flood plain modeling effort was required to determine the most cost-effective manner to ensure the remedial action will not result in any significant increase in flood levels during the occurrence of the base (100-year) flood.

Protection of the Hoosic River and the on-site wetlands was required to avoid potential adverse impacts from the consolidation, capping and flood-plain mitigation activities. Erosion control measures including soil berms, silt fencing and hay bales were used to protect against erosion and siltation at the Site. These controls were maintained

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throughout the construction phase. A vegetative cover was established for all disturbed areas of soil and sediment (including lagoons 1 and 5).

Prior to construction activities, a staging area for temporary facilities and equipment needed to be constructed within the footprint of Lagoon 2. This effort required clearing and grubbing of Lagoon 2, installation of settlement enhancement measures (Wick Drains), and placement of compacted fill material to bring the ground surface up to the surrounding grade. The EPA coordinated with the Town of Pownal to complete the installation of the Wick Drains. This effort occurred during July and August of 2003. During the Fall of 2003 the remaining lagoons were completely cleared and grubbed to create a suitable working surface for the staging area and the areas that were excavated and capped. Trees and vegetation that were removed were chipped and used as the base of the landfill. Lagoon 2 will also be used by the Town of Pownal to construct a waste water treatment facility which began in 2005.

Stabilization and Excavation of Wastes from Lagoons 1 and 5

A geotechnical investigation was completed during the remedial design to determine the most appropriate method for sludge removal and transportation. This investigation included advancing test pits within the lagoons for sample collection and laboratory testing (shear strength tests), as well as on-site observation of the behavior of the sludge during excavation. A phased plan was developed to limit the generation of gasses/vapors (including hydrogen sulfide) and odors, minimize the accumulation of water within the excavation, and to prevent contamination of clean backfill with potentially contaminated excavation water. It was determined that the sludge needed to be stabilized with the addition of Portland cement in order to compact in the landfill and meet the strength specification. Prior to the removal of all clean cover soils over the sludge, in-situ stabilization was completed in lagoons 1 and 5. These cover soils were set aside until excavation was complete and used as backfill into the lagoons.

During and after the stabilization process, continuous air monitoring in the work zone and at perimeter air monitoring stations was performed to ensure no unacceptable releases of contaminants of concern. Additionally, a water truck was used for the suppression of dust and a foam suppressant was used to suppress the odors. A silt fence with hay bales were installed along the access road bordering the river, and a sedimentation trap was installed. A temporary perimeter road was constructed around the landfill to facilitate excavation/consolidation/capping activities - approximately 2,200 linear feet of road. This road consists of a layer of geo-textile and crushed stone. A similar access road was created between lagoons 1 and 5. A new fence was erected around the entire perimeter of the lagoon area. The response action included construction of temporary storm water controls to minimize storm water run-on into the Lagoon Area. De-watering of portions of the lagoons was required to facilitate construction of the base or foundation layer. De-watering was achieved by pumping out the ponded water and the use of a temporary sump. Recovered water was pumped to a treatment system to remove contaminants of concern including PAH compounds, dioxins, and metals. The treatment system consisted of settling tanks to remove bulk

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solids and granular activated carbon units in series. The clean water was discharged to the Hoosic River.

The stabilized sludge was removed using standard excavators down to an underlying gravel layer in lagoons 1 and 5, which constituted the physical limits of the excavation. Adjacent berm material affected by the lagoon contamination was also excavated. The excavated sludge and berm soil was placed directly into dump trucks and transported to the footprint of the landfill for compaction. Following excavation, confirmatory soil sampling was completed in lagoon pits 1 and 5, to determine if the soil cleanup criteria have been met at the horizontal limits of the excavation. Confirmatory soil sampling was not done for the bottom of the excavations since the limit of sludge is well defined by a gravel layer at the bottom of each lagoon. Lagoons 1 and 5 was backfilled continuously as the stabilized sludge was excavated. Both lagoons were backfilled with crushed stone, overlaid with clean fill to bring it back up to the elevations specified in the remedial design. The excavated berms were covered with filter fabric and backfilled with clean fill.

Construction of the Solid Waste Landfill Cap at Lagoons 3 and 4

The approximate extent of the in-place cap is shown in Figure 2. The stabilized sludge that was transported to lagoons 3 and 4 was compacted to 90 percent of the maximum dry density determined in accordance with the standard Proctor compaction test. Lagoons 3 and 4 were not stabilized, as they did not need to be excavated and transported. No chemical testing of excavated sludge was conducted since all sludge was moved to the landfill and capped. A low-permeability cap was constructed over the excavated sludge and soil to limit exposure to the contaminated material, to mitigate infiltration of contaminants to the groundwater and to prevent erosion. The landfill cap has a five percent slope on the barrier and drainage layer and a two percent slope on its surface. The cap has the following configuration:

- 6 inch layer of granular foundation/gas vent sand layer;
- 40-mil linear low density polyethylene ("LLDPE") geomembrane barrier layer;
- Geocomposite drainage layer;
- 24 inches of vegetative support soil layer; and
- 6 inch layer of topsoil.

The side slope of the landfill has a maximum slope of 33.3 percent. The configuration of the side slope cap from top to bottom includes:

- 6 inch layer of granular foundation/gas vent sand layer;

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- Textured 40-mil linear LLDPE geomembrane barrier layer;
- Double-sided geocomposite layer;
- 24 inch layer of Granular cover soil (east side);
- 6 inches of top soil (east side);
- 12 inch layer of crushed stone (west side); and
- 24 inch layer of rip-rap (west side - designed to resist the anticipated maximum flow velocity of the 100-year flood flow)

Restoration measures for lagoons 1 and 5 include: 1) construction of permanent storm water and sedimentation/erosion controls, 2) installation of groundwater monitoring wells for post remediation monitoring, 3) grading, loaming and seeding of all disturbed areas including the landfill cover and lagoons 1 and 5, 4) establish a 100' wide riparian buffer zone along the berm adjacent to the Hoosic River, 5) installation of fencing along a portion of the cap toe and placement of large boulders around a portion of the upper perimeter, 6) install an access gate to the landfill, and 6) complete construction of the perimeter access road.

The volumes of contaminated waste materials and clean overburden soils/materials are presented in the table below.

Lagoon Area Material Volumes	
Location	Volumes
Lagoon 1 & 5 Stabilized Sludge	81,381 tons
Portland Cement added to stabilize sludge	6,142 tons
Screened gravel added to lagoons as backfill	20,589 tons
Imported general fill to backfill lagoons	75,000 tons
Cover soils excavated and reused as lagoon backfill	33,000 tons
Cover/berm materials placed in the landfill	10,200 tons
Imported landfill cover soil	25,000 cubic yards
6" of topsoil on landfill	22,000 cubic yards
Geomembrane for landfill cap	26,371 Square Yards

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Lagoon Area Material Volumes	
Location	Volumes
Geocomposite drainage layer for landfill	20,243 square yards
Rip rap for landfill cap	9,350
Gas vent sand	22,270 square yards
Crushed gravel on landfill side slopes	2,259 cubic yards

Floodplain Protection.

The cap was designed, constructed, and will be maintained to withstand a 100-year flood event without releasing any contaminants into the environment. In order to ensure adequate flood storage, an additional measure was taken to lower the elevation of the northern portion of lagoon 4 to 500 feet above mean sea level to create an outlet for flood waters. Both sides of this berm have been armored with 6 inch riprap, for an overbank water flow velocity of 8.5 feet per second. A setback of 140 feet between the toe of the land-side of the soil berm and the toe of the landfill will be maintained. This area was backfilled and re-graded. The riprap that was placed around the river side of the landfill further acts to prevent erosion during flood events.

Air Monitoring

During all phases of work, a perimeter air monitoring program was provided to monitor for the presence of contaminants in the air along the limits of the site. Upwind and downwind air space was monitored for dust, hydrogen sulfide, and VOCs on a continuous basis using 4 monitoring stations and additional portable stations within work areas. Site action levels were determined during the Remedial Design to be protective of workers and nearby residents.

Perimeter air monitors and personal air monitors were equipped with alarms to notify site workers when dust, hydrogen sulfide, and VOC emissions were above site action levels. When site alarms sounded, countermeasures such as ceasing site operations until levels subsided, applying foam and water to suppress odors, and/or upgrading to a higher level of personal protective equipment (i.e., full-face respirator with supplied oxygen), were immediately implemented. As a result, there were no incidences of impacts to workers and minimal detection of odors by residents. Data collected as part of the air monitoring program are provided in the February 2005 Remedial Action Report (located at EPA's Record Center in Boston, Massachusetts).

The Action Limit for particulate matter was equal to a downwind monitor reading 54 g/m³ greater than the upwind monitor. Some exceedances of the Action Limit occurred. Cement off-loading to the vented hoods caused particulate exceedances on nine days ranging in time from 30 to 250 minutes. Water was used to suppress dust on all occasions. On three occasions, small releases of cement from the cement hood led to

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the exceedances, and at these times, work was halted until corrections were made. Other activities that led to particulate exceedances include heavy vehicle traffic (including large dump trucks), excavation, grading activities and hydroseeding conducted immediately adjacent to the monitoring equipment. Such occurrences happened on 15 work days and spanned over time periods ranging from 30 to 150 minutes. Dust suppression methods were applied when needed. On six days, high humidity led to particulate exceedances that lasted up to 120 minutes.

Exceedances of the VOC monitoring Action Limit occurred when the 15 minute time weighted average (TWA) was greater than 5 ppm. Vehicles idling near air monitors caused exceedances for a short period on two days. Efforts were made to limit idling after these incidences. In early July, grading and dumping activities produced three 15 minute exceedances. VOC exceedances were attributed to high humidity on three days over the course of work, with these exceedances ranging from 15 to 120 minutes in the early morning hours.

An exceedance of the Action Limit for H₂S was defined as a one hour TWA greater than 0.1 ppm. There were no exceedances for H₂S during the remedial activities.

As part of the health and safety program for the workers, a majority of the sludge stabilization work was performed in OSHA Level C personal protective equipment (PPE) - full face respirators, especially the laborers in and around the lagoons during mixing and excavation operations. In addition, the cabs of the heavy equipment conducting the mixing were equipped with supplied oxygen, thus the equipment operators were generally performing work in Level B PPE.

Also as part of the health and safety program, a full-time health and safety officer was provided for all work conducted on-site. A site specific health and safety plan was provided and implemented for each phase of work. The program included routine monitoring of workers, continuous maintenance of safe working conditions, and daily and weekly safety briefings for all workers.

IV. CHRONOLOGY OF EVENTS

Date/Year Activity

12/30/1981	Pownal Tannery applies for a permit to construct and operate a lined landfill.
01/21/1982	The Vermont Agency of Natural Resources (VT ANR) determined that the sludge in the lagoons should not be regulated as hazardous waste.
06/09/1982	A disposal facility certification was issued to permit construction and operation of a lined landfill.
1985	The VT ANR issued a letter to the Pownal Tannery alleging deficiencies and maintenance problems at the site.
1987	Two thirds of the landfill was closed and covered by the Pownal Tanning Company.

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04/06/1988	The Vermont Agency of Environmental Conservation issued an Administrative Order to Pownal Tannery requiring odor control, excavation of sludge from Lagoon 2, preparation of a cleanup plan for Lagoons 4 and 5, further testing of groundwater, and a complete risk assessment.
1993	A time-critical removal action was conducted by EPA to remove compressed gas cylinders, asbestos-containing materials, and various containers of hazardous materials.
1995	The hazard Ranking System Package was completed as part of the CERCLA site listing process.
09/29/1998	The site was proposed for the National Priorities List (NPL).
01/11/1999	The site was added to the NPL.
08/1999	The Town of Pownal was awarded a Superfund Redevelopment Initiative Grant from EPA to study reuse options for the site after remediation is complete.
1999-2001	EPA conducted a non-time critical removal action (NTCRA) to decontaminate and demolish the tannery buildings, remove contaminated soils along the Hoosic River, and permanently cap the Dean Road landfill.
02/2001	The Town completed the reuse study. The plan included construction of a sewage treatment plant, a skating rink, recreational open areas and nature trails through the Lagoon Area.
09/30/2002	EPA Record of Decision completed indicating plans for excavation and capping of Lagoons 1, 3 and 5.
05/2003	Remedial design completed.
09/2003	Phase I construction activities begin
11/30/2003	Phase I site construction activities completed.
09/30/2004	Phase II site lagoon area remediation completed.
09/27/2005	Final Inspection

V. PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

All work performed at the Site was consistent with the NTCRA/ROD and the final design and RA Work Plans. The RA Work Plan Reports, including the Quality Assurance Project Plans (QAPP), incorporated all EPA quality assurance and quality control (QA/QC) procedures and protocol. EPA analytical methods were used for all validation and monitoring samples during RA activities. All procedures and protocol followed for soil, discharge water and air sample analysis during the RAs have been consolidated and documented in two RA Work Plan Reports, dated November 2001 and February 2005. EPA has found the construction quality assurance and performance data to be acceptable. Performance data was regularly reviewed during the construction program to confirm that the materials installed met the requirements of the plans and specifications.

All construction quality assurance material is located in the EPA Region I Records Center in Boston, MA. The QA/QC program utilized throughout construction was sufficiently rigorous and was adequately complied with to enable EPA and the State to determine that the results reported are accurate to the degree needed to assure

**Remedial Action Report, Pownal Tannery Superfund Site,
September 2005**

satisfactory execution of the RA, consistent with the NTCRA and ROD and accepted remedial design documents.

VI. FINAL INSPECTION AND CERTIFICATION

All preliminary completion requirements for the Site have been met as specified in OSWER Directive 9320.2-09A-P (January 2000). Specifically, all construction activities that constitute substantial completion identified in the ROD have been successfully implemented and a final inspection by EPA and the VTDEC was conducted on September 27, 2005 and it was determined that the remedy was constructed as designed and is operational and functional. Institutional controls to prevent the use of contaminated groundwater at the Site, and any disturbance of the constructed landfill will be completed by September 2007. Operation and Maintenance activities will be permanently maintained by the VTDEC as required by the Superfund State Contract, dated July 2003.

Schedule for Site Completion

Task	Actual Start/Completion	Responsible Organization
Operation/Functional period for remedy	September 2005 Completed	EPA
Institutional Controls	September 30, 2007	EPA
Operation & Maintenance for Site	December 2004 - 2034	VT DEC
First Five-Year Review	September 30, 2008	EPA with VT DEC

VII. OPERATION AND MAINTENANCE ACTIVITIES

All areas of the two landfill caps and the former building area have been seeded, are growing well and are currently being regularly mowed by the VDEC. Plantings in the riparian buffer zone are growing and under warranty for another year, to replace plants that may not survive. All access gates are being maintained and are currently intact. All areas of erosion off of the caps have been repaired and will be maintained. EPA replaced and developed a damaged monitoring well in September 2005, which is included in a long term groundwater monitoring program to be conducted by the VDEC. EPA also extended the gas vents in the lagoon area and added sampling ports.

VDEC began O&M activities at the completion of the NTCRA for the first landfill cap/leachate collection system and the former building area. They began O&M activities for the ROD response action in October 2004. The current activities are included in the updated September 2005 O&M Plan.

VIII. SUMMARY OF PROJECT COSTS

The estimated cost to complete the NTCRA was a total net present value of \$7,700,000. The expended cost to complete this action was \$7,405,500. The ROD estimated the remedial action would be a total net present value of \$8,800,000. The capital costs were estimated at \$7.6 million, the Operation and Maintenance costs were estimated at \$1.2 million. The Remedial Action Work Plan estimate was \$9,659,163. Due to contractual savings and efficiency it is anticipated that the final project cost will be approximately \$8,400,000. The total costs will be identified when the current work assignment is closed out in December 2005. There will be nominal contractual costs associated with the Operational and Functional phase of the project completed in September 2005.

IX. FIVE YEAR REVIEW

Hazardous substances will remain at the Site above levels that allow for unlimited use and unrestricted exposure after the completion of remedial action. Pursuant to CERCLA section 121(c) and as provided in OSWER Directive 9355.7-03B-P, "Structure and Components for Five-Year Reviews," dated June 2001, EPA must conduct statutory five-year reviews. The first five year review is scheduled for September 2008 (5 years after the start of remedial construction - September 2003). Subsequent five-year reviews will be conducted to ensure the remedy remains protective of public health and the environment. Finally, EPA will determine and document Site completion in accordance with OSWER Directive 9320.2-3A/3B "Procedures for Completion and Deletion of National Priorities List Sites" and OSWER Directive 9320.2-09 (August 1995).

X. OBSERVATIONS AND LESSONS LEARNED

Several innovative design elements and construction elements were used to complete the remedial action at these former tannery sludge lagoons in less than 12 months. This Site completed construction of the final remedial action in September 2004. The design and construction approach used for this project was successful in achieving an aggressive schedule and in meeting budget requirements. Among the innovative design elements included:

- Top slope landfill design that allows for use as soccer field and integration of the Town's recreational re-use design concept;
- Uncommon "L-shaped" design to maintain maximum distance from the adjacent river and to minimize the impact to the floodway;
- Berm modifications to provide flood conveyance;
- Pre-screening of borrow pits to ensure historic preservation compliance (i.e., cultural resources);

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- Use of natural boulder barriers rather than less attractive, typical chain-link fencing;
- Phased design to allow early project initiation prior to the on-set of winter;
- Wick drain dewatering of underlying clay layer to accelerate settlement and allow construction of a municipal waste water treatment plant on the site;
- In-situ sludge stabilization to minimize odor, toxic gas emissions (H₂S) and multiple handling of sludge;
- Customized hood to apply concrete in controlled manner (reduce dust);
- Use of sheetpile to allow work in close proximity to railroad tracks (maintain structural integrity of rail-line);
- Use of foam to control tannery odors;
- Customized water discharge system to disperse flow and minimize channel erosion; and
- Construction of water management units during stabilized sludge excavation to minimize use of self-compacting clean fill and to minimize the volume of water requiring treatment.

Several complex project elements included:

- Worked with the state of Vermont to pass special legislation to amend their Solid Waste Facility Rules to allow EPA to implement cleanup actions that are protective of human health, despite non-compliance with the standards in the Solid Waste Rules (dioxin present);
- Handling odors in close proximity to residential neighborhoods;
- Simultaneous implementation of several complicated activities that required precise coordination, including, in situ stabilization, sludge excavation, sludge compaction in a solid waste facility; and
- Efficient processing of materials for gravel fill, cover soils and top soils using temporary equipment set up at borrow pit (equipment brought into a local pit).

XI. CONTACT INFORMATION

The EPA used the following contractors for the response measures:

Lee LePage (NTCRA response)
Stone & Webster a Shaw Group Company
100 Technology Center Drive
Stoughton, MA 02072

Donald Dwight (ROD response)

**Remedial Action Report, Pownal Tannery Superfund Site,
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Metcalf and Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01880

Team Subcontractor and Design Engineer (for ROD response):

Dale Weiss
TRC Environmental Corporation
Boott Mills South
Foot of John Street
Lowell, MA 01852

Lead Construction Subcontractor:

Jim Maxymillion
Maxymilliam Technologies, Inc.
1801 East Street
Pittsfield, Massachusetts 01201

The Project Manager for EPA was: The Project Manager for the VTDEC was:

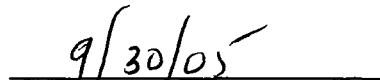
Leslie McVickar
U.S. EPA
One Congress Street
Suite 1100, HBT
Boston, Massachusetts 02114

Brian Woods
VT DEC
103 South Main Street, West Building
Waterbury, Vermont 05671

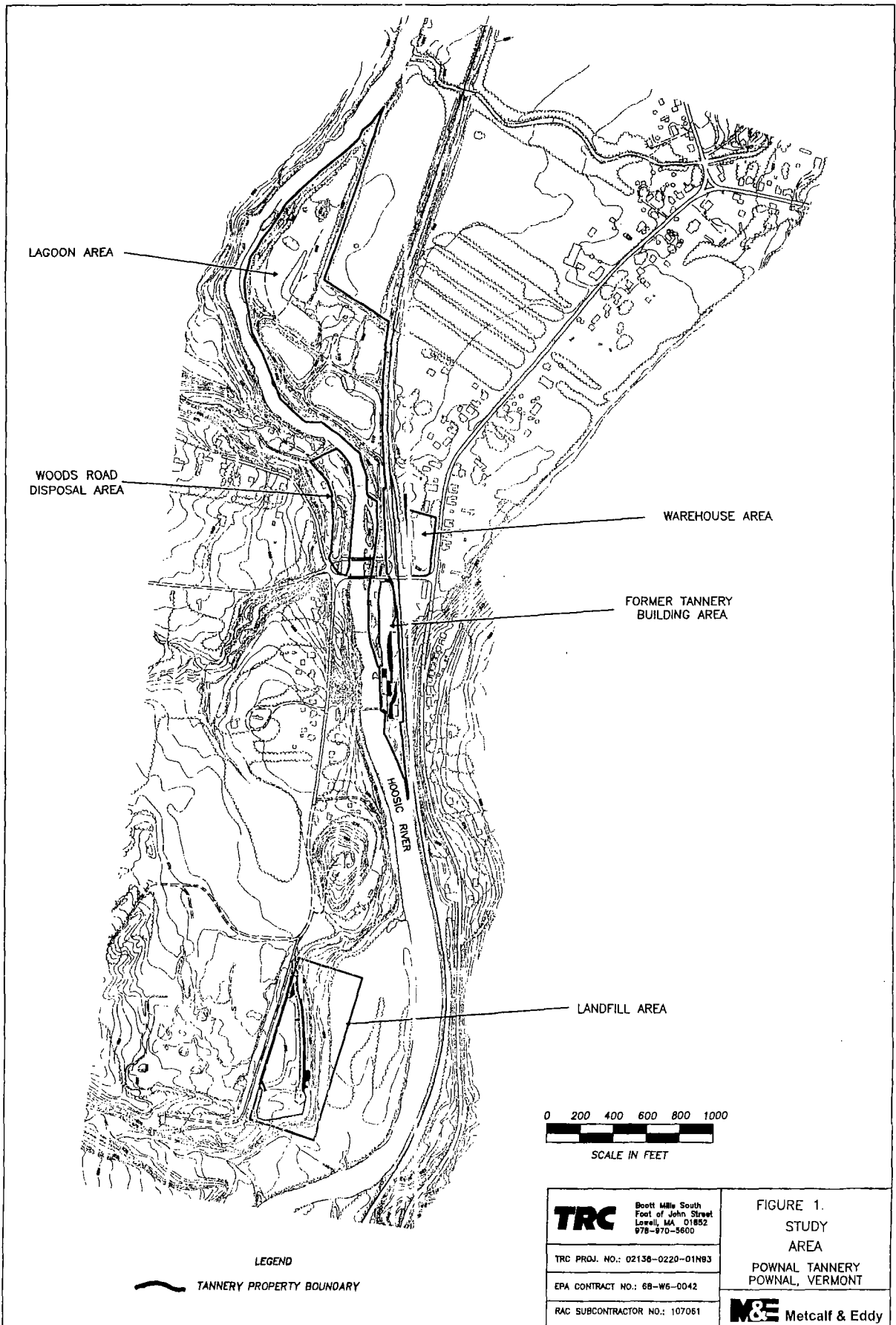
Approved by:


Larry Brill, R & R1 Branch Chief

Office of Site Remediation and Restoration


Date

FIGURES



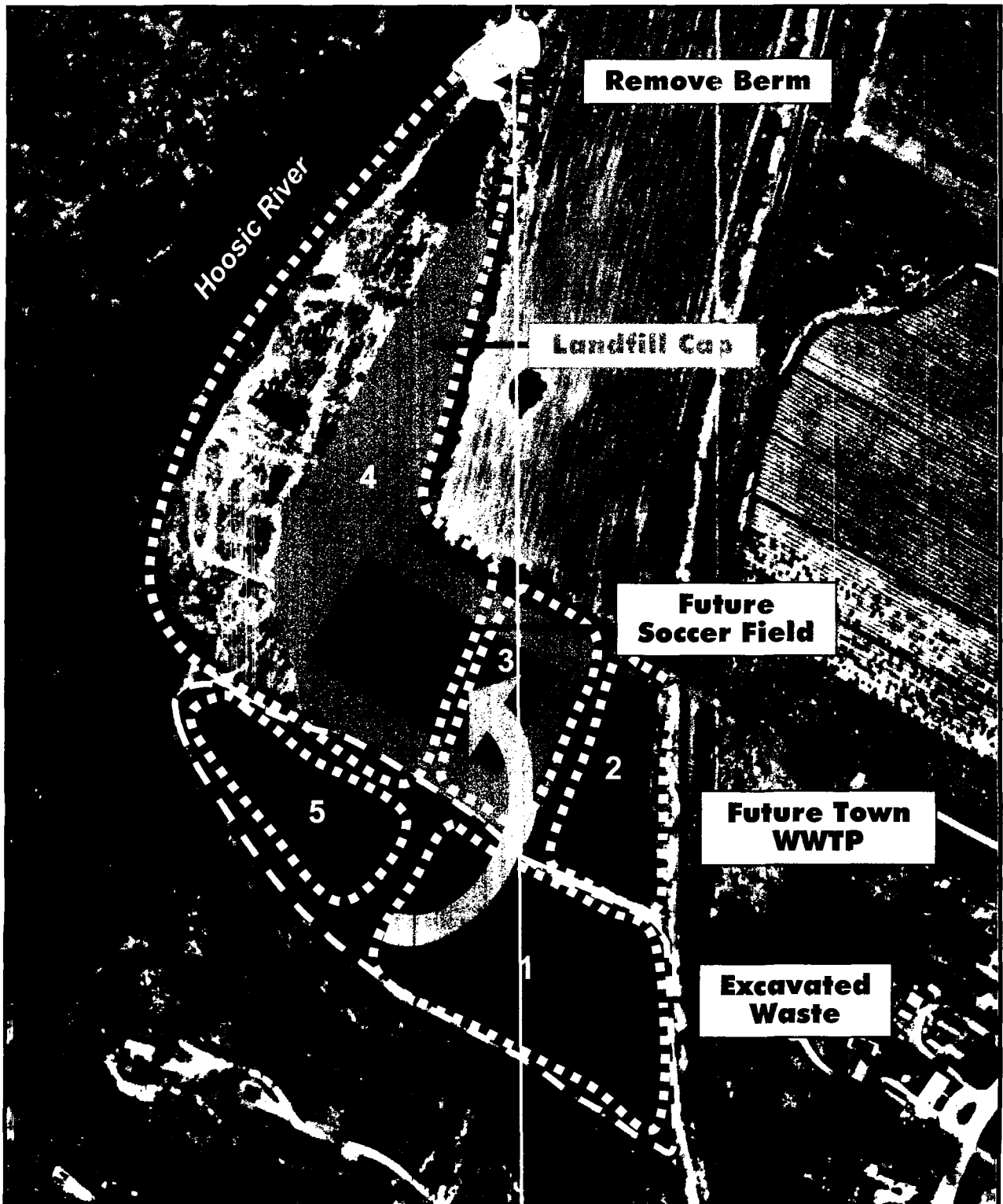


Figure 2
POWNAL LAGOON CLOSURE AND
REDEVELOPMENT

POWNAL TANNERY
 POWNAL, VERMONT

M&E Metcalf & Eddy

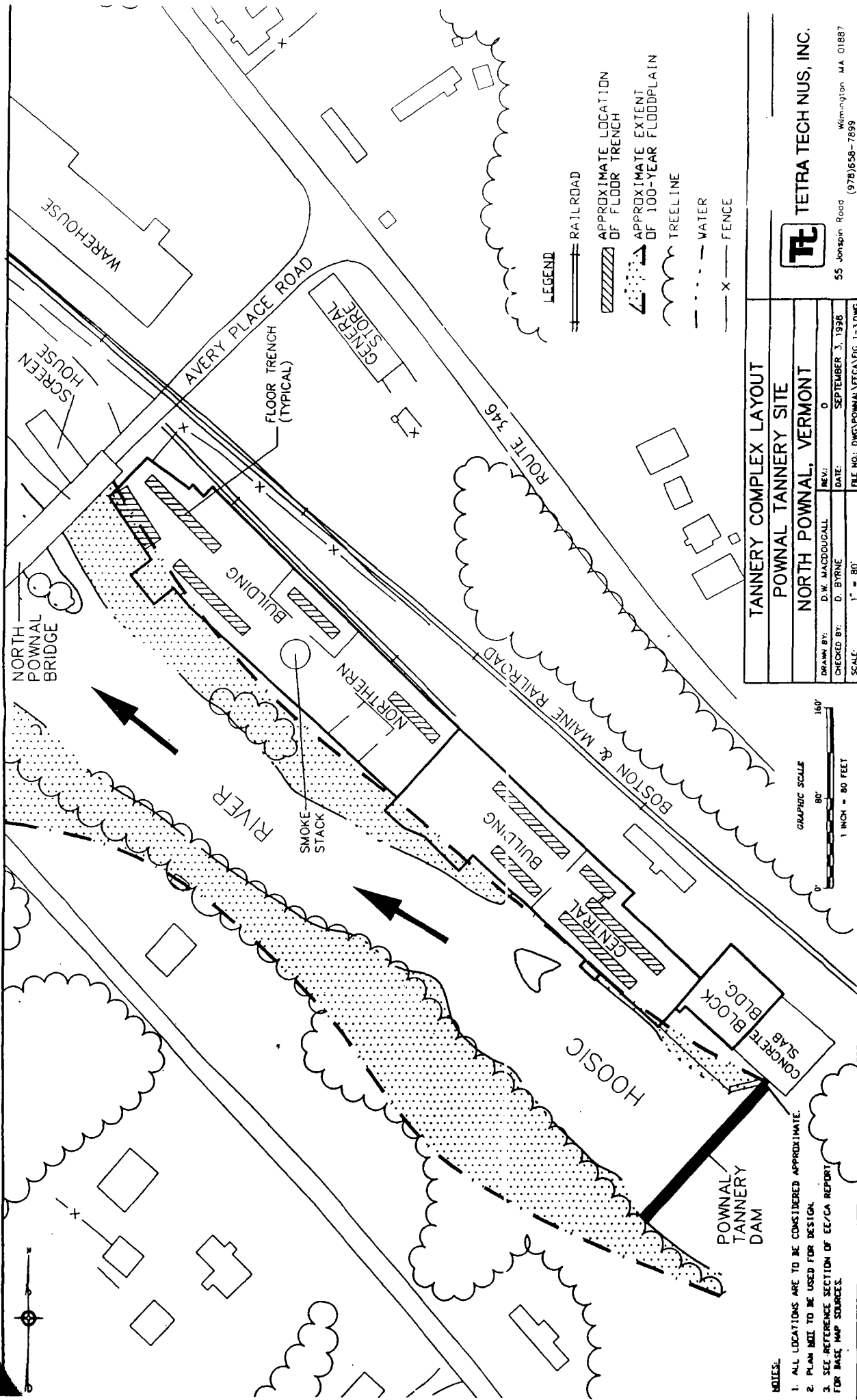
TRC

Boott Mills South
 Foot of John Street
 Lowell, MA 01852
 978-970-5600

TRC PROJ. NO.: 02136-0540-01N91

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



NOTES:

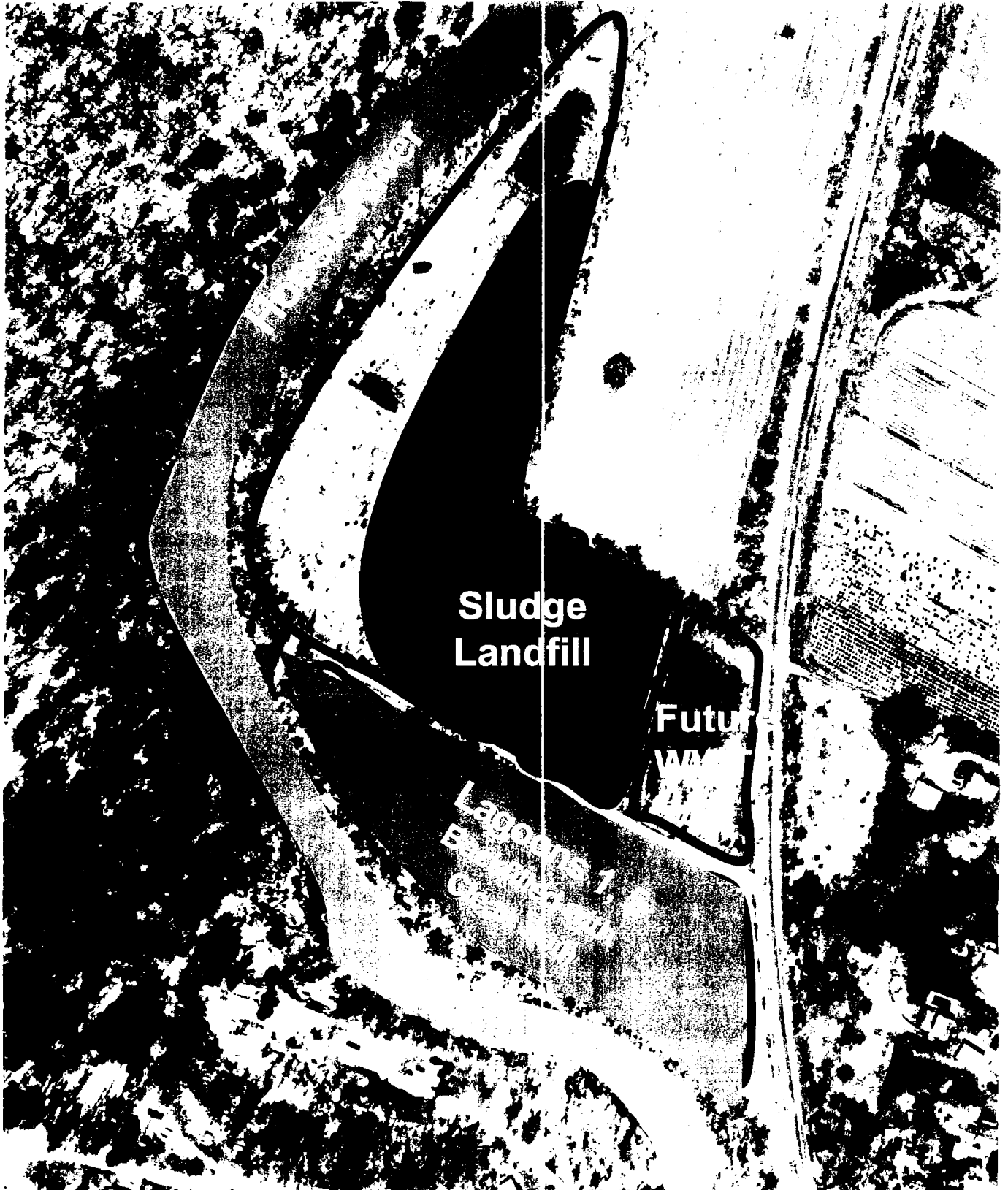
1. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
2. PLAN WILL TO BE USED FOR DESIGN.
3. SEE REFERENCE SECTION OF EE/CA REPORT FOR BASE MAP SOURCES.

TANNERY COMPLEX LAYOUT			
POWNAL TANNERY SITE			
NORTH POWNAL, VERMONT			
DRAWN BY:	D. W. MACDOUGALL	REV:	0
CHECKED BY:	D. BYRNE	DATE:	SEPTEMBER 3, 1998
SCALE:	1" = 80'	FILE NO:	DWG/POWNAL/EECA/FIG. 1-3.DWG

TETRA TECH NUS, INC.

55 Jonson Road
Wilmington MA 01887
(978) 658-7899

Pownal Tannery Lagoon Area Cleanup Plan



APPENDIX A

FINAL INSPECTION REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1

MEMORANDUM

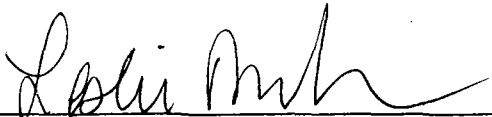
DATE: September 28, 2005

SUBJECT: Pownal Tannery Superfund Site, Pownal, Vermont
Final Site Inspection

FROM: Leslie McVickar,
Remedial Project Manager

TO: The File

On September 27, EPA and the Vermont Department of Environmental Conservation (VTDEC) conducted its final inspection of the Pownal Tannery Superfund Site. Both EPA and the VTDEC concur that the Remedial Response measures detailed in the March 1999 Action Memorandum for a Non-Time Critical Removal Action (NTCRA) and the September 2002 Record of Decision (ROD) have been constructed in accordance with all applicable Remedial Action Work Plans and Remedial Design Reports. All punch list items related to the Remedial Action noted in the September 2004 Preliminary Close Out Report (PCOR) have been completed and the Response Action is effectively operational and functional (punch list attached).



Leslie McVickar, EPA Remedial Project Manager

September 30, 2005
Date



George Desch, Sites Management Section Chief

October 7, 2005
Date